486NL
VL-Bus Mainboard
User's Manual
(04)

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Acknowledgements

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Chapter 1

PREFACE

1-1 Checklist

Your main board package should contain the following:

- The 486NL Cache mainboard
- This manual

1-2 Introduction to the cache main board

The cache main board performs efficiently and would be served as an important basic element for advanced personal computer. This board is compatible with the system board of IBM AT. Actually, this board contains 486 microprocessor, a 32-bit memory access, and other features so that it gives a PC to have treble performance compared with a 8MHz IBM AT.

Another distinguished feature of this board is the 486NL chip set. There are one LSI chips inside this set. As it works, user can easily adjust the relationship between CPU, expansion bus, and onboard memory. The result is a high degree of flexibility in the configuration of the board.

1-3 Features

- Copy-Back direct mapped cache with size of 64 KB, 128KB, 256KB.
- 16 Bytes line size.
- Burst line fill during cache read miss.
- System speed would be adjusted by software or hardware.
- Support 256K/1M/4M DRAM.
- 32MB memory on board expandable.
- Shadow RAM for BIOS and VIDEO ROM to i mprove performance.
- KEYLOCK and SPEAKER interface provided.
- Real-time clock with on board rechargeable batt ery or external
  battery to back up CMOS memory for system co nfiguration data.

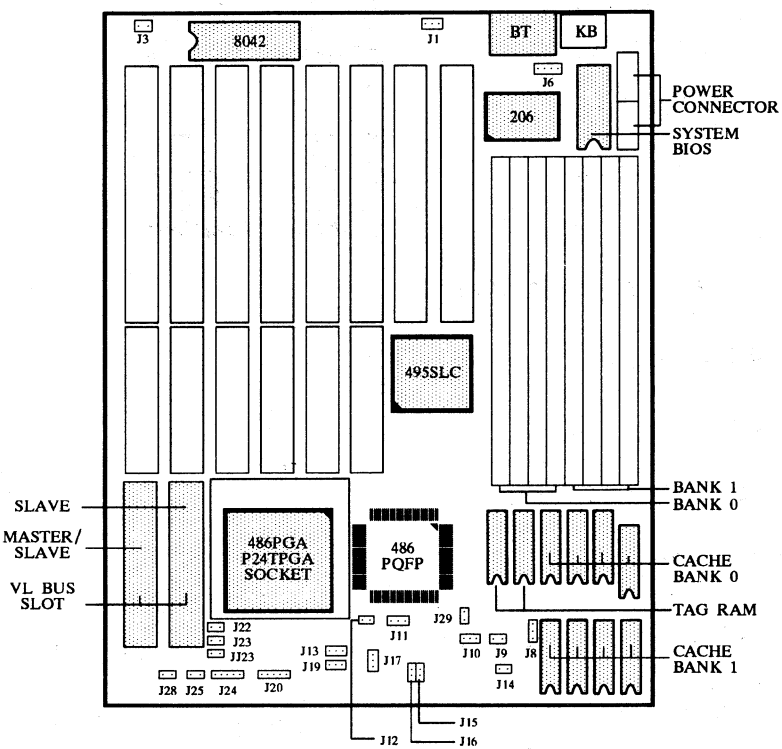
1-4 Specification

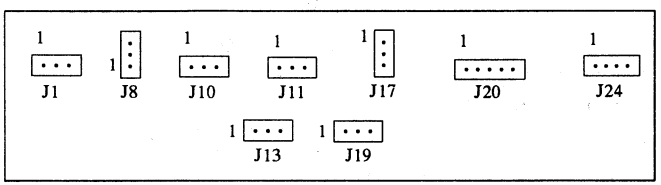
Central processing unit:	486DX-33/50; 486DX2-50/66; 486SX-20/25/33; P24T; CX486 (M6)
Main memory:	on board 32MB
On board memory model:	1MB, 2MB, 4MB, 5MB, 8MB, 16MB, 20MB, 32MB
DRAM access cycle time:	80 ns
Cache memory:	64KB, 128KB, 256KB (option)
Data Bus Widths:	32 bits
I/O slots:	8 Expansion slots: 8 bits x 2 16 bits x 6 VL-BUS x 2

Chapter 2

DESCRIPTION OF THE CACHE BOARD

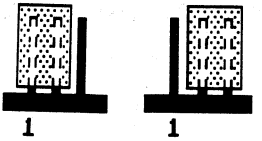
2-1 Components Layout





2-2 Jumper Setting Short Form

J1: Discharge Battery



1-2 Discharge

2-3 Battery Enable

J3: Monitor Type

ON Color

OFF Mono

J6: External Battery

J22: RESET

J23: Turbo Led

JJ23: Turbo S/W

J24: SPK

J25,J28: CPU Speed

		J25	J28
CPU Speed	<=33	off	X
	>33	on	X
High Speed Write	0 WS	X	off
	1 WS	X	on

J15-J17: CPU CLK

	J15	J16	J17
25MHz	on	off	1-2
33MHz	off	on	1-2
40MHz	on	on	2-3
50MHz	on	off	2-3

J11-J13: CPU Type

	J11	J12	J13
486DX	2-3	on	1-2
486SX	1-2	off	2-3

J8,J9,J10,J14: Cache Configer

	J8	J9	J10	J14	U26	U25
64KB	2-3	off	1-2	off	8Kx8	N/A
128KB	1-2	on	2-3	off	8Kx8	N/A
256KB	2-3	on	1-2	on	8Kx8 (32Kx8)	8Kx8 (N/A)

J29: PQFP CPU Select

ON: PQFP CPU Disable

OFF: PQFP CPU Enable

J20: Keylock

J19: 1-2: Cyrix DX2 MODE

2-3: Cyrix DX MODE

2-3 RAM Subsystem

Memory Configuration

Bank 0	Bank 1	Total Memory
256K	0	1M
256K	256K	2M
1M	0	4M
256K	1M	5M
1M	1M	8M
4M	0	16M
1M	4M	20M
4M	1M	20M
4M	4M	32M

2-4 Cache Memory

Our main board can support 64KB, 128KB or 256KB cache memory. If enables this mode:

All the data stored in main memory will be duplicated some of them in the cache subsystem, then this data become to be accessed quickly. If the requested data is found in the cache, the memory access is called a cache "hit"; if not, it is called a cache "miss". The hit rate is the percentage of accesses that are hit.

It is affected by the size and physical organization of the cache, the cache algorithm, and the program begin run.

Chapter 3

HARDWARE INSTALLATION

3-1 Before Installation

This chapter talks about how to install a working system based upon our 486NL. Beforehand you must obtain the following equipment:

- A chassis to hold the main board and all the peripheral devices.
- A multi-voltage power supply, which is same sort of the one used in the IBM AT. A 200 watt or higher rating power supply is recommended.
- A 3.6V battery to sustain the clock/calendar chip.
- An 8 ohms speaker to provide sound for the system.
- A hard/floppy disk controller with cables connected to drives.
- At least one floppy disk drive (1.2KB or 1.44MB).
- A hard disk if needed.
- A display controller and corresponding monitor.
- An AT-compatible keyboard.
- MS-DOS version 5.0 or later.

3-2 Hardware Setup

3-2-1 Keyboard Connection

The keyboard connector (KB1) is a 5-pin DIN connector which provides an interface to IBM AT compatible keyboard.

Pin Assignment of Keyboard Connector

Signal/Function	Pin No.
KEYCLK (clock)	1
KEYDAT (data)	2
N/C	3
Ground	4
+5V	5

3-2-2 Power Supply Connection

The power connector (J4,J5) is a 12 pins connector, which connect main board with power supply. When using an AT compatible power supply, pin 1 through 12 of power supply should match pin 1 through 12 on main board.

Pin Assignment of the Power Connector

Signal/Function	Colour	Pin NO.
Power Good	orange	1
+5V	red	2
+12V	yellow	3
-12V	blue	4
Ground	black	5
Ground	black	6
Ground	black	1
Ground	black	2
-5V	white	3
+5V	red	4
+5V	red	5
+5V	red	6

3-2-3 Speaker Interface Connection

Pin Assignments of Speaker Connector

Signal/Function	Pin NO.
Speaker Drive out	1
Key	2
Ground	4
+5V	3

3-2-4 Keylock Interface Connection

Pin Assignments of Speaker Connector

Signal/Function	Pin NO.
Power for power on/off LED	1
Key (pin removed)	2
Ground	3
Keylock	4
Ground	5

Chapter 4

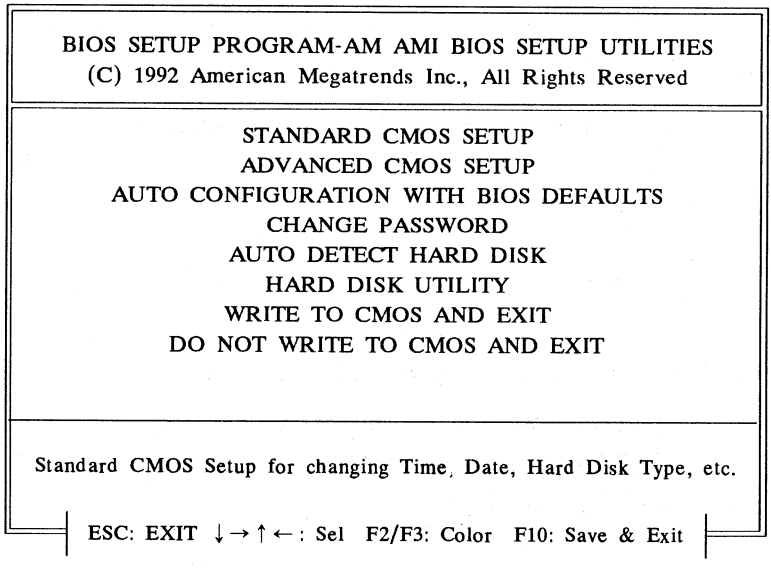
SOFTWARE CONFIGURATION

In this chapter, you will learn how to operate the setup program and set the register configuration. Before you go, you should have assembled a working system. Power the system on and wait for the BIOS to activate.

How to use the setup program

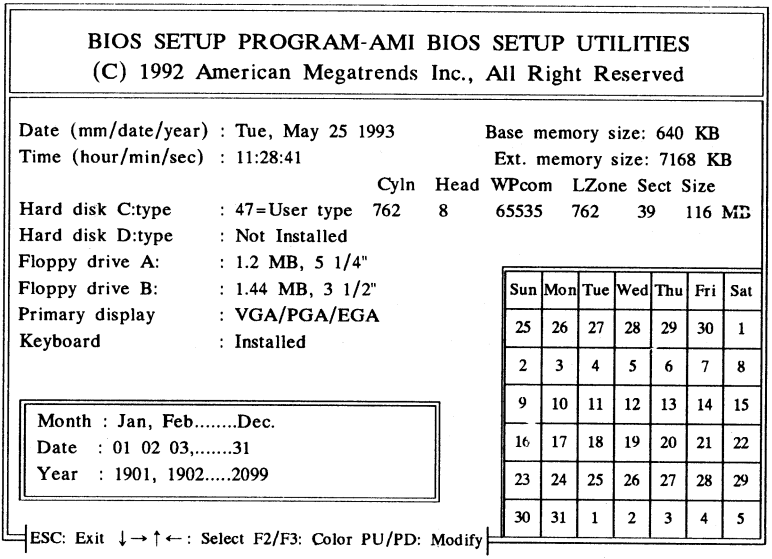
Immediately finishing the memory and cache test, you will get the following prompt on the screen:

"Press <Del> If you want to run SETUP"



Run CMOS Setup

If you desire to change the CMOS Setup then move the cursor to "RUN CMOS SETUP" and press < Enter > . The screen will then move to the menus on the following:



This menu divides into three parts. The right side shows the status. The lower left shows the instructions. The upper left shows the items which can be selected and there is a blink cursor on this part to wait for input. Use the ↓ → ↑ ← to select the item you want to set <PgDn> and <PgUp> to toggle the options until the desired one.

NOTE:

1. When the keyboard is installed, the ROM tests the keyboard; otherwise it does not.
2. Video BIOS shadow enable while the video adaptor provides this function.
3. The Scratch RAM option offers the selection to position BIOS STACK.

Advanced CMOS Setup

The Advanced CMOS setup is designed to provide a relatively easy to record setup configurations for the 486NL CACHE main board's chipset. These information include memory size, speed, type and configuration. it should be very careful to follow our instruction. Incorrect entry of information can result in system hang up. If this happens, you need to clear the CMOS memory on the board and in the chipset and reenter the correct configuration.

Advanced CMOS Setup

If you desire to enter the Advanced CMOS Setup then move the cursor to "Advanced CMOS SETUP" and press < Enter > . The screen will then move to the menus on the following.

AMIBIOS SETUP PROGRAM - ADVANCED CMOS SETUP
(C) 1992 American Megatrends Inc., All Rights Reserved

Above 1MB Memory Test	: Disabled	Adaptor ROM Shadow D000,16K	: Disabled
Memory Test Tick Sound	: Enabled	Adaptor ROM Shadow D400,16K	: Disabled
Memory Parity Error Check	: Enabled	Adaptor ROM Shadow D800,16K	: Disabled
Hard Disk Type 47 RAM Area	: 0:300	Adaptor ROM Shadow DC00,16K	: Disabled
System Boot Up Num Lock	: On	Adaptor ROM Shadow E000,16K	: Disabled
Floppy Drive Seek At Boot	: Disabled	Adaptor ROM Shadow E400,16K	: Disabled
System Boot Up Sequence	: A:, C:	Adaptor ROM Shadow E800,16K	: Disabled
External Cache Memory	: Enabled	Adaptor ROM Shadow EC00,16K	: Disabled
Internal Cache Memory	: Enabled	System ROM Shadow F000,64K	: Enabled
Turbo Switch Mode Select	: 2		
Password Checking Option	: Setup		
Video ROM Shadow C000,16K	: Enabled		
Video ROM Shadow C400,16K	: Enabled		
Adaptor ROM Shadow C800,16K	: Disabled		
Adaptor ROM Shadow CC00,16K	: Disabled		

Esc: Exit ↓ → ↑ ← : Sel (Ctrl) Pu/Pd: Modify F1: Help F2/F3: Color
F5: Old Values F6: BIOS Setup Defaults F7: Power-On Defaults

AMIBIOS SETUP PROGRAM - ADVANCED CHIPSET SETUP
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Hidden Refresh	: Enable
AT BUS Clock Selection	: CLKI/6
486NL DX2 CPU Select	: No
Non-Cacheable Block Size	: Disabled
Non-Cacheable Block Base	: 0 KB
Cacheable RAM Address Range	: 64 MB

ESC: Exit (Ctrl) Pu/Pd: Modify F1: Help F2/F3: Color
F5: Old Values F6: BIOS Setup Defaults F7: Power-On Defaults

Write CMOS Register And Exit

After building your new configuration, you should select the "Write CMOS Register And Exit" function to record in the CMOS memory. After-wards, the mother board will then check this every time you turn on the system.

Do Not Write CMOS Registers And Exit

If you select the function "Do Not Write CMOS Register And Exit", then all your new configuration will be neglected.

Having made all necessary entires in the above setup programs, you can now proceed to use your system without further reference to these programs until you wait to make system hardware change or the system configuration stored in CMOS RAM is lost.

Clearing The CMOS RAM

You must be very careful to use the extended setup program. If you make an error, the system will then be hanged up. If this happens, you must use the CMOS RESET to rectify the problem and reenter the correct information again.

The 486NL CACHE board is provided with a hardware CMOS RESET (J22) and a software CMOS RESET.

CPU TYPE	J11	J12	J13	J15	J16	J17	J19	J25	J29
486SX-25 PQFP	1-2	off	2-3	on	off	1-2	off	off	off
486SX-33 PQFP	1-2	off	2-3	off	on	1-2	off	off	off
486SX-25 PGA	1-2	off	2-3	on	off	1-2	off	off	on
486SX-33 PGA	1-2	off	2-3	off	on	1-2	off	off	on
486DX-25 PGA	2-3	on	1-2	on	off	1-2	off	off	on
486DX-33 PGA	2-3	on	1-2	off	on	1-2	off	off	on
486DX-40 PGA	2-3	on	1-2	on	on	2-3	off	on	on
486DX-50 PGA	2-3	on	1-2	on	off	2-3	off	on	on
486DX2-50 PGA	2-3	on	1-2	on	off	1-2	off	off	on
486DX2-66 PGA	2-3	on	1-2	off	on	1-2	off	off	on
CX486S-33 PGA	1-2	off	2-3	off	on	1-2	off	off	on
CX486S-40 PGA	1-2	off	2-3	on	on	2-3	off	on	on
CX486S+CX487S-33 PGA	2-3	on	1-2	off	on	1-2	off	off	on
CX486S+CX487S-40 PGA	2-3	on	1-2	on	on	2-3	off	on	on
CX486DX-40 PGA	2-3	on	1-2	on	on	2-3	2-3	on	on
CX486DX-50 PGA	2-3	on	1-2	on	off	2-3	2-3	on	on
CX486DX2-40 PGA	2-3	on	1-2	on	on	1-2	1-2	off	on
CX486DX2-50 PGA	2-3	on	1-2	on	off	1-2	1-2	off	on
CX486DX2-66 PGA	2-3	on	1-2	off	on	1-2	1-2	off	on

486NL CPU Jumper Setting Checking List